Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Original) An imaging device, comprising:

a photosensing array of a plurality of sensing pixels arranged in rows and columns, each pixel having a photosensing element to produce charge in response to incident photons from an object and an in-pixel circuit to convert said charge into an electrical pixel signal representing said charge; and

an integrator array of a plurality of integrators arranged in rows and columns respectively equal to said rows and columns of said photosensing array,

wherein integrators of each column are coupled to receive electrical pixel signals from only one designated column of sensing pixels in said photosensing array and are operable to produce time-delayed integration signals representing the object after each sensing pixel is sampled and read out for a number of times equal to a number of said rows in said photosensing array.

2. (Original) The device as in Claim 1, wherein each integrator in said integrator array includes a capacitor-switched integrator.

3. (Previously Presented) An imaging device, comprising:

a photosensing array of a plurality of sensing pixels arranged in rows and columns, each pixel having a photosensing element to produce charge in response to incident photons from an object and an in-pixel circuit to convert said charge into an electrical pixel signal representing said charge; and

an integrator array of a plurality of integrators arranged in rows and columns respectively equal to said rows and columns of said photosensing array,

wherein integrators of each column are coupled to receive electrical pixel signals from only one designated column of sensing pixels in said photosensing array and are operable to produce time-delayed integration signals representing the object after each sensing pixel is sampled and read out for a number of times equal to a number of said rows in said photosensing array,

wherein each integrator in said integrator array includes a capacitor-switched integrator, and

wherein an operation of one integrator on a signal from one sensing pixel is temporarily overlapped with another operation of an adjacent integrator on another signal from a respective adjacent sensing pixel.

4. (Previously Presented) An imaging device, comprising:

a photosensing array of a plurality of sensing pixels arranged in rows and columns, each pixel having a photosensing element to produce charge in response to incident photons from an object and an in-pixel circuit to convert said charge into an electrical pixel signal representing said charge; and

an integrator array of a plurality of integrators arranged in rows and columns respectively equal to said rows and columns of said photosensing array,

wherein integrators of each column are coupled to receive electrical pixel signals from only one designated column of sensing pixels in said photosensing array and are operable to produce time-delayed integration signals representing the object after each sensing pixel is sampled and read out for a number of times equal to a number of said rows in said photosensing array,

wherein each integrator in said integrator array includes a capacitor-switched integrator, and

wherein a single input terminal of said capacitor-switched integrator is coupled to a first sampling capacitor that stores a first signal from a first sensing pixel and a second sampling capacitor that stores a second signal from a second sensing

pixel adjacent to said first sensing pixel, said first and second signals being generated at different times.

5. (Previously Presented) An imaging device, comprising:

a photosensing array of a plurality of sensing pixels arranged in rows and columns, each pixel having a photosensing element to produce charge in response to incident photons from an object and an in-pixel circuit to convert said charge into an electrical pixel signal representing said charge; and

an integrator array of a plurality of integrators arranged in rows and columns respectively equal to said rows and columns of said photosensing array,

wherein integrators of each column are coupled to receive electrical pixel signals from only one designated column of sensing pixels in said photosensing array and are operable to produce time-delayed integration signals representing the object after each sensing pixel is sampled and read out for a number of times equal to a number of said rows in said photosensing array,

wherein each integrator in said integrator array includes a capacitor-switched integrator, and

wherein said capacitor-switched integrator is a differential integrator which has a first input terminal to

receive an electrical pixel signal and a second input terminal to receive a reference signal.

6. (Previously Presented) An imaging device, comprising:

a photosensing array of a plurality of sensing pixels arranged in rows and columns, each pixel having a photosensing element to produce charge in response to incident photons from an object and an in-pixel circuit to convert said charge into an electrical pixel signal representing said charge; and

an integrator array of a plurality of integrators arranged in rows and columns respectively equal to said rows and columns of said photosensing array,

wherein integrators of each column are coupled to receive electrical pixel signals from only one designated column of sensing pixels in said photosensing array and are operable to produce time-delayed integration signals representing the object after each sensing pixel is sampled and read out for a number of times equal to a number of said rows in said photosensing array,

wherein each integrator in said integrator array includes a capacitor-switched integrator, and

wherein said capacitor-switched integrator includes a single-ended amplifier whose output is coupled to a circuit

having a reset sampling capacitor, an integrating capacitor, and a plurality of switches, said switches positioned in said circuit to connect said reset sampling capacitor and said integrating capacitor to store only a difference between a reset potential and a signal potential from a pixel into said integrating capacitor.

7. (Original) The device as in claim 1, wherein said in-pixel circuit includes an amplifier.

8. (Original) The device as in claim 1, wherein said photosensing element includes a photogate or a photodiode.

9. (Original) The device as in claim 1, wherein said sensing pixels are reset at the same time.

10. (Original) The device as in claim 1, further comprising at least one ADC coupled to digitize an output from said integrator array.

11. (Original) The device as in claim 1, wherein each sensing pixel is sampled for a first time to produce a reset

value and for a second time after a photo-induced signal is generated to produce a signal value for each readout.

12. (Original) An imaging device, comprising:

a substrate formed of a semiconductor;

a sensing array of active pixel sensors in n rows and m columns fabricated on a first area of said substrate, operable to respond to photons to produce electrical pixel signals; and

an integrator array fabricated on a second area of said substrate adjacent to said first area, said integrator array having m amplifiers electrically coupled to said m columns of active pixel sensors, respectively, wherein each amplifier is coupled to n pairs of capacitors so that each pair of capacitors accumulate electrical pixel signals from n different active pixel sensors in a respective column that are generated at different times to produce a summed signal.

13. (Original) The device as in claim 12, wherein each amplifier samples each sensing pixel twice during each readout to obtain a differential pixel signal between a reset value and a photon-induced signal value of said each sensing pixel.

14. (Original) The device as in claim 13, wherein each pair of capacitors are coupled to a respective amplifier in a way that one capacitor receives said reset value and another capacitor receives said photon-induced signal value.

15. (Original) The device as in claim 14, wherein each amplifier is a differential amplifier which has a first input coupled to a designated column of active pixel sensors and a second input coupled to a reference.

16. (Currently Amended) A method for imaging an object, comprising:

using a linear sensing array of pixels along a predetermined direction to capture radiation from the object that moves relative to the sensing array along the direction;

internally converting radiation-induced charge in each pixel of the linear sensing array into a voltage representing an electrical pixel signal;

coupling a linear integrator array of switched-capacitor integrators to the linear sensing array to sample multiple frames of images of the object generated by the sensing array, wherein for each frame, columns of pixels in the linear sensing

array are mapped to respective columns of switched-capacitor integrators in the linear integrator array; and

spatially shifting the mapping from the linear sensing array to the integrator array in sampling the different frames along the predetermined direction to produce a summed signal that sums pixel signals from different pixel locations of different frames corresponding to a common image from a location on the object.

17. (Original) The device as in claim 16, further comprising sampling each pixel twice in each frame to obtain a differential value between a reset level and a signal level of each pixel.

18. (Previously Presented) A method for imaging an object, comprising:

using a linear sensing array of pixels along a predetermined direction to capture radiation from the object that moves relative to the sensing array along the direction;

internally converting radiation-induced charge in each pixel of the array into an electrical pixel signal;

coupling a linear integrator array of integrators to the sensing array to sample multiple frames of images of the object generated by the sensing array;

spatially shifting the mapping from the sensing array to the integrator array in sampling the different frames along the predetermined direction to produce a summed signal that sums pixel signals from different pixel locations of different frames corresponding to a common image from a location on the object;

sampling each pixel twice in each frame to obtain a differential value between a reset level and a signal level of each pixel; and

temporarily overlapping sampling a reset level of a first pixel and sampling a signal level of a second adjacent pixel.

19. (Previously Presented) The method as in claim 18, wherein each integrator includes a switched-capacitor integrator.